Conventional Question

1. Solve the following inequalities and represent the solutions graphically.

(a) $\dfrac{19-3x}{2} < 5$

(b) $4(5-2x) \le 6x-1$

(c) $\dfrac{x+6}{4} > \dfrac{3x+19}{10}$

2. Simplify the following expressions.

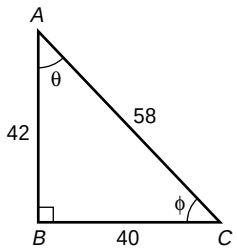
(a) $\dfrac{6x^2}{5y} \times \dfrac{25y}{24xy^2}$

(b) $\dfrac{2x}{3x+y} \div \dfrac{9x^2}{9x^2-y^2}$

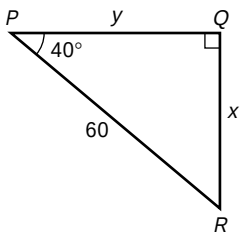
(c) $\dfrac{3}{x-5} + \dfrac{2}{5(5-x)} - 1$

3. Find the unknowns in each of the following figures. (Give your answers correct to 3 significant figures.)

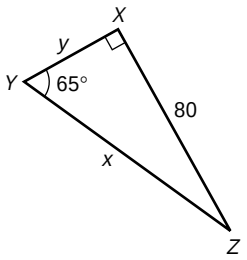
(a)



(b)

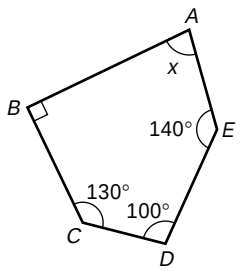


(c)

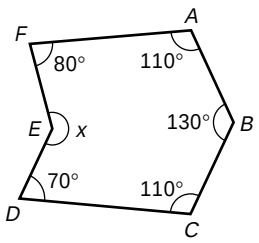


4. Find x in each of the following figures.

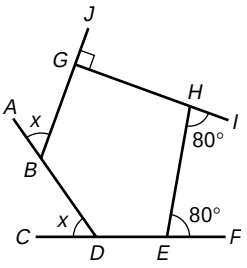
(a)



(b)



(c) *ABD*, *CDEF*, *BGJ* and *GHI* are straight lines.



5. Find the mean, median and mode of each of the following sets of data.

(a) 3, 4, 5, 6, 6, 6

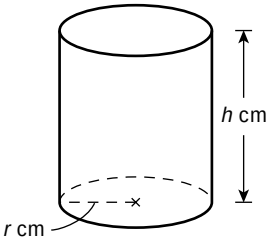
(b) 9, 8, 8, 9, 6, 9, 7

(c) 3, 5, 8, 8, 5, 4, 2, 1

6. **(a)** Solve the inequality $x+3<\frac{x+37}{6}$.

(b) Write down the largest integer which satisfies the inequality $x+3<\frac{x+37}{6}$.

7. In the figure, the base radius, height and the total surface area of the right cylinder are r cm, h cm and $A\text{ cm}^2$ respectively.



(a) Express A in terms of r and h.

(b) Find the value of A if $r=7$ and $h=4$. (Take $\pi=\frac{22}{7}$.)

(c) **(i)** Make h the subject of the formula obtained in **(a)**.

(ii) Find the value of h if $A=350\pi$ and $r=9$.

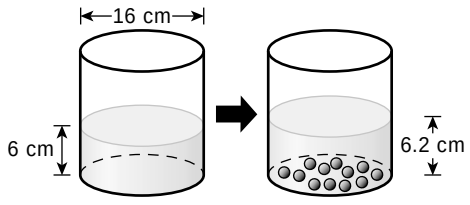
8. It is known that the mean of the following set of data is greater than 10.

$x-3,\ x-1,\ x+2,\ x+4,\ x+6$

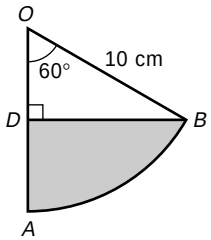
(a) Find the range of values of x.

(b) Can the smallest data in the data set be 5? Explain briefly.

9. In the figure, the base diameter of the cylindrical vessel is 16 cm. The depth of water inside the vessel is 6 cm. If 12 identical marbles are completely immersed into water, the water level rises to 6.2 cm. Find the volume of each marble. (Give your answer correct to 3 significant figures.)



10. In the figure, the radius of sector OAB is 10 cm, $\angle AOB = 60°$. D is a point on OA such that $BD \perp OA$.



(a) Find OD and BD.

(b) Find the area of the shaded region.

(Give your answers correct to 3 significant figures if necessary.)

11. Cindy attends a typing course. After x lessons, her typing speed is w words/min, where the relation between w and x can be expressed as a formula as follows:

$$w = \frac{56(x+1)}{x+8}$$

(a) Find the typing speed of Cindy after 6 lessons.

(b) **(i)** Make x the subject of the formula.

(ii) Can the typing speed of Cindy become 60 words/min? Explain briefly.

12. In Figure I, the area of sector OAB is $20\pi \text{ cm}^2$.

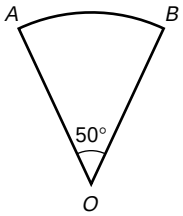


Figure I

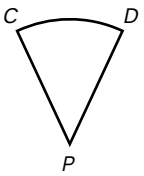


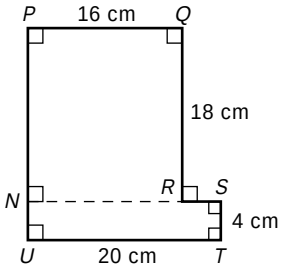
Figure II

(a) Find the radius of sector OAB.

(b) Find the perimeter of sector OAB. (Express your answer in terms of π.)

(c) In Figure II, sector PCD is similar to sector OAB, and its area is $\frac{45\pi}{4} \text{ cm}^2$. Find the radius of sector PCD.

13. In the figure, $PQRSTU$ is a hexagonal card. N is a point on PU such that $RN \perp PU$. All measurements in the figure are correct to the nearest cm.



(a) Write down the maximum absolute error of the measurements.

(b) Find the smallest possible area of the card.

(c) Assume that the actual area of the card is x cm^2, find the possible range of x.

14. The following back-to-back stem-and-leaf diagram shows the scores of S2A students in a *psychological test*.

Boys Leaf (1)	Stem (10)	Girls Leaf (1)
6 5 4 3	5	5 7 9
7 5 3 2 0	6	3 4 6 8 9 9
4 4 4 3 1 0 0	7	0 1 2 7 7 7 8
5 4 2	8	0 1 6 6

(a) Find the median score of the boys.

(b) Find the median score of the girls.

(c) **(i)** Complete the table to show the score distribution of the S2A students in the psychological test.

Score	Frequency
50 - 59	
60 - 69	
70 - 79	
80 - 89	

(ii) According to the table, find the modal class of the scores of the S2A students.

psychological test 心理測驗

15. Table I and Table II are the frequency distribution table and cumulative frequency table of the height distribution of 60 people respectively, where a, b, c, x, y and z are integers.

Height (cm)	Frequency
146 - 150	6
151 - 155	a
156 - 160	22
161 - 165	b
166 - 170	c

Table I

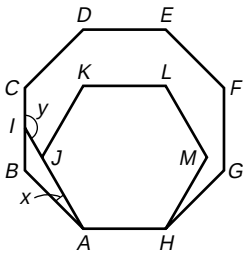
Height less than (cm)	Cumulative Frequency
150.5	x
155.5	16
160.5	y
165.5	53
170.5	z

Table II

(a) Find a, b, c, x, y and z.

(b) Find the mean of the heights of the 60 people. (Give your answer correct to the nearest cm.)

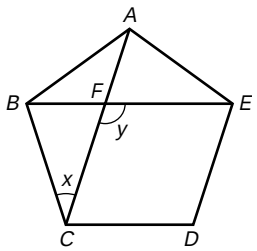
16. In the figure, $ABCDEFGH$ is a regular octagon. $AJKLMH$ is a regular hexagon. AJI and BIC are straight lines.



(a) Find x.

(b) Find y.

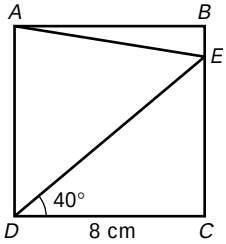
17. In the figure, $ABCDE$ is a regular pentagon. AC and BE intersect at F.



(a) Find x.

(b) Find y.

18. In the figure, $ABCD$ is a square with the sides of 8 cm each. E is a point on BC such that $\angle EDC = 40°$.



(a) Find $\angle AEB$.

(b) Find AE.

(c) Find the perimeter of ΔADE.

(Give your answers correct to 3 significant figures.)

MC Question

19. The solutions of $3(4-x) > -15$ are

A. $x > 9$.

B. $x < 9$.

C. $x > 27$.

D. $x < 27$.

20. It is given that $y = \dfrac{6x-2}{z+1}$. If $x = 3$ and $y = 2$, then $z =$

A. $\dfrac{11}{6}$.

B. $\dfrac{16}{3}$.

C. 7.

D. 8.

21. If the interior angle of a regular n-gon is $150°$, then $n =$

A. 10.

B. 12.

C. 15.

D. 36.

22. If the mean of ten numbers 10, 8, 8, 8, 9, 6, 12, 11, 11, x is 9, find the median of these ten numbers.

A. 7.5

B. 8

C. 8.5

D. 9

23. Consider the following 5 numbers.

$x+4,\ x+3,\ x+2,\ x+4,\ x+12$

Which of the following must be correct?

I. The mean is $x+5$.

II. The median is $x+2$.

III. The mode is 2.

A. **I** only

B. **II** only

C. **I** and **II** only

D. **II** and **III** only

24. If $a > b$, which of the following must be correct?

I. $-a < -b$

II. $a + b > b$

III. $ab > b^2$

A. **I** only

B. **II** only

C. **II** and **III** only

D. **I**, **II** and **III**

25. If $y = \dfrac{1+x}{1-x}$, then $x =$

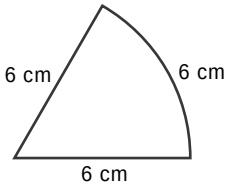
A. $\dfrac{1+y}{1-y}$.

B. $\dfrac{1-y}{1+y}$.

C. $\dfrac{y+1}{y-1}$.

D. $\dfrac{y-1}{y+1}$.

26. Find the area of the following sector.



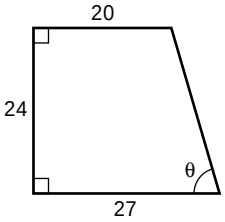
A. $18\ \text{cm}^2$

B. $36\ \text{cm}^2$

C. $18\pi\ \text{cm}^2$

D. $36\pi\ \text{cm}^2$

27. In the figure, $\sin\theta =$



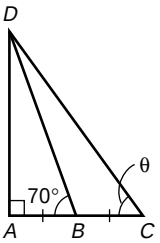
A. $\dfrac{7}{25}$.

B. $\dfrac{24}{27}$.

C. $\dfrac{24}{25}$.

D. $\dfrac{24}{7}$.

28. In the figure, ABC is a straight line. $\tan\theta =$



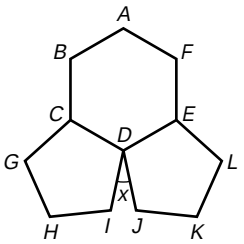
A. $\tan 35°$.

B. $2\tan 70°$.

C. $\dfrac{1}{2}\tan 70°$.

D. $\dfrac{1}{2\tan 70°}$.

29. In the figure, $ABCDEF$ is a regular hexagon. $CGHID$ and $DJKLE$ are regular pentagons. Find x.



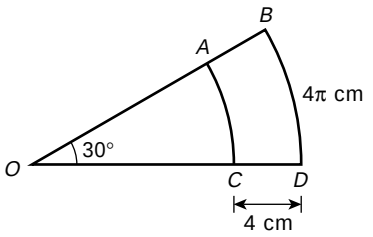
A. 12°

B. 20°

C. 24°

D. 36°

30. In the figure, *OAB* and *OCD* are straight lines. *OAC* and *OBD* are sectors. Find $\overset{\frown}{AC}$.



A. π cm

B. $\frac{10\pi}{3}$ cm

C. $(4\pi - 4)$ cm

D. 4π cm